

Bunker Hill
Mine Water
Upgrade HDS Plant & Add Media Filters (2,500gpm) (Equivalent to Phase I
CTP Masterplan)
Order of Magnitude Cost Opinion

DATE: 11/29/2000
PROJECT NO.: 152215.FS.02
ESTIMATE BY: D. Hedglin

| DESCRIPTION | QTY | UNIT | TOTAL UNIT COST | TOTAL COST | COMMENTS |
|--|-------|------|-----------------------|---------------|---|
| HDS (Hydroxide) | | | | | |
| Sitework/Yard Piping | | | | | |
| Fencing | 500 | LF | 10.00 | \$5,000 | allowance |
| Gravel Surfacing & Misc | 1 | LS | 25,000.00 | \$25,000 | allowance |
| Connections & Relocations of Existing Piping | 1 | LS | 30,000.00 | \$30,000 | allowance |
| AMD Coarse Filter | | | | | |
| Earthwork & Concrete for Slab & Sump | 1 | LS | 6,000.00 | \$6,000 | 10cy @ \$600 |
| 2500gpm Self-Cleaning Filter | 2 | EA | 16,563.04 | \$33,126 | quote + frt + markup |
| Appurtenances for Filter | 2 | EA | 21,738.95 | \$43,478 | 4-valves, fittings, misc |
| Electrical for Filter | 2 | EA | 5,000.00 | \$10,000 | allowance |
| Cleaning Debris Bin | 2 | LS | 1,000.00 | \$2,000 | Fiberglass tank due to pH 2 |
| Structural Steel Tank Support System | 1 | LS | 5,000.00 | \$5,000 | allowance |
| Supernatant Pump | 1 | EA | 10,000.00 | \$10,000 | Low pH |
| Mechanical for Pump | 1 | LS | 5,000.00 | \$5,000 | slab, FG tank, concrete sump, pH 2 reqs FG & acid rest conc |
| | | | | \$114,604 | |
| Lime Feed System | | | | | |
| Earthwork & Concrete for Slab, Curbs, Sumps, etc | 1 | LS | 79,488.00 | \$79,488 | apx 200cy @ \$400/cy |
| Retaining Wall to Accommodate New Tank | 550 | SF | 25.00 | \$13,750 | 55'x 8'H + 2' below grade, CIP cantilever |
| Earthwork for Retaining Wall | 1 | LS | 6,814.27 | \$6,814 | |
| Paint | 1 | LS | 50,000.00 | \$50,000 | allowance for subcontract |
| Lime Silo, 21'x 48' h, Conical, Coated Steel | 1 | EA | 179,040.98 | \$179,041 | quote + 5%frt, rep, sp pts + 10%mu, esca;ated |
| Screw Feeder, 9" dia x 20' long | 2 | EA | 14,774.78 | \$29,550 | quote + 5%frt, rep, sp pts + 10%mu, esca;ated |
| Lime Slaker, Grit Screen & Screw, Controls | 2 | EA | 74,816.42 | \$149,633 | quote + 5%frt, rep, sp pts + 10%mu, esca;ated |
| Lime Slurry Storage Tank, 43000gal | 1 | EA | 34,015.95 | \$34,016 | |
| Lime Slurry Storage Tank Mixer, 15hp | 2 | EA | 17,190.11 | \$34,380 | |
| Slurry Circulation Pumps, 100gpm, 50' tdh | 4 | EA | 16,901.45 | \$67,606 | |
| Slurry Transfer Pumps, 100gpm, 50' tdh | 4 | EA | 16,901.45 | \$67,606 | same as above |
| Grit Bin | 2 | EA | 2,183.17 | \$4,366 | allowance |
| Clean, Refurbish, Upgrade Existing System | 1 | LS | 24,653.63 | \$24,654 | allow hours & misc parts i.e. bin vents,etc |
| Truck Unloading Improvements | 1 | LS | 10,000.00 | \$10,000 | ACP, curbing, etc - allowance |
| Lime Slurry Piping, 2" GE Steel | 1,000 | LF | 20.20 | \$20,205 | incl cplgs, ftgs, etc, on pipe rack |
| Piping Rack | 250 | LF | 25.00 | \$6,250 | allowance |
| Reactor A (Sludge Conditioning Tank) | | | | | |
| Earthwork & Concrete for Slab | 1 | LS | 19,872.00 | \$19,872 | apx 50cy @ \$400/cy |
| Elevated Platform for Reactor A&B | 1 | LS | 60,000.00 | \$60,000 | asm 40x20 @ \$75/sf high level and to support reactor A |
| Paint | 1 | LS | 10,000.00 | \$10,000 | allowance for subcontract |
| Sludge Conditioning Tank, 2500gal FRP | 1 | EA | 42,694.85 | \$42,695 | quote + 5% infla. + 5%frt + 10%mu |

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| Mixer, 3hp | 1 | EA | 13,802.75 | \$13,803 | quote + 5% infla. + 5%frt + 10%mu |
| Inlet Piping, 24" SDR 15.5 | 120 | LF | 193.68 | \$23,242 | constrained schedule & access w/obstacles, ftgs, valves, connections, etc |
| Inlet Piping, 18" SDR 15.5 | 120 | LF | 146.95 | \$17,634 | constrained schedule & access w/obstacles, ftgs, valves, connections, etc |
| Valves, vaults, etc | 1 | LS | 50,000.00 | \$50,000 | allowance |
| Neutralization/Oxidation System | | | | | |
| Distribution Piping, 24" HDPE | 170 | LF | 193.68 | \$32,926 | constrained schedule & access w/obstacles, ftgs, valves, connections, etc |
| Retaining Wall to Accommodate New Tank | 450 | SF | 25.00 | \$11,250 | 45'x 8'H + 2' below grade, CIP cantilever |
| Earthwork for Retaining Wall | 1 | LS | 6,814.27 | \$6,814 | |
| Earthwork & Concrete for Slab | 1 | LS | 65,577.60 | \$65,578 | apx 165cy @ \$400/cy |
| Paint | 1 | LS | 50,000.00 | \$50,000 | allowance for subcontract |
| Aeration Tank (Reactor B), 75,000gal Steel Tank | 1 | EA | 37,500.00 | \$37,500 | revised to \$.50/gal |
| Submerged Turbine Aerator/Mixer | 1 | EA | 73,520.37 | \$73,520 | use same a 5000gpm estimate |
| Positive Displacement Blower | 1 | EA | 13,205.04 | \$13,205 | |
| Pipe Supports, Hangers, etc | 1 | LS | 2,500.00 | \$2,500 | allowance |
| Automated Polymer Make-up & Feed System | | | | | |
| Earthwork & Concrete for Slab | 1 | LS | 0.00 | \$0 | in bldg |
| Paint | 1 | LS | 5,000.00 | \$5,000 | allowance for subcontract |
| Polymer Make-up System | 2 | EA | 10,216.52 | \$20,433 | |
| Polymer Make-up Tank, 2000gal | 1 | EA | 3,973.95 | \$3,974 | |
| Mixer | 2 | EA | 2,337.07 | \$4,674 | corrected hours |
| Transfer Pump, 20gpm | 2 | EA | 3,273.75 | \$6,548 | corrected hours |
| Polymer Feed Tank, 2000gal | 1 | EA | 3,973.95 | \$3,974 | |
| Variable Speed Gear Pump, 1gpm | 2 | EA | 4,210.43 | \$8,421 | |
| Piping to Feed Point | 100 | LF | 19.90 | \$1,990 | |
| Thickener | | | | | |
| Clean & Decommission Existing Floc System | 1 | LS | 1,774.62 | \$1,775 | |
| Replace Weir | 1 | LS | 28,860.00 | \$28,860 | quote + frt & markup=\$19/lf & allow for removal & replacement |
| Groundwater Test & Empty Tank | 1 | LS | 10,000.00 | \$10,000 | allowance |
| Replace Thickener Rake System Complete | 1 | LS | 146,934.08 | \$146,934 | quote + frt & markup |
| E-DUC Feed & Floc System & Center Well Mods | 1 | LS | 45,933.63 | \$45,934 | quote + frt & markup + add'l parts for mods |
| Surface Prep & Coat | 1 | LS | 100,000.00 | \$100,000 | allowance for interior walls & mechanism |
| Sludge Wasting & Recycle Pumps | | | | | |
| Earthwork & Concrete for Slab | 1 | LS | 79,488.00 | \$79,488 | apx 200cy @ \$400/cy |
| Remove Existing Pumps | 1 | LS | 2,474.40 | \$2,474 | |
| Paint | 1 | LS | 20,000.00 | \$20,000 | allowance for subcontract |

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| Sludge Recycle Pump, 400gpm | 2 | EA | 14,616.89 | \$29,234 | new cost for smaller pump |
| Sludge Recycle Pump, 800gpm | 2 | EA | 22,047.87 | \$44,096 | new cost for smaller pump |
| Sludge Waste Pump, 400gpm, 200' tdh | 2 | EA | 26,380.15 | \$52,760 | new cost for larger pump |
| Sludge Recycle Piping, 8" DI | 600 | LF | 68.47 | \$41,084 | including ftgs, valves, etc, revised cost |
| Sludge Wasting Piping, 6" DI | 400 | LF | 54.78 | \$21,912 | including ftgs, valves, etc, revised cost |
| I&C and Electrical | | | | | |
| Total I&C | 1 | LS | 108,103.26 | \$108,103 | use 5% of above |
| Generator & Fuel Tank | 1 | EA | 352,246.48 | \$352,246 | same as 5000gpm + escalation |
| New Magnetic Flowmeter in Existing Vault | 1 | EA | 10,268.68 | \$10,269 | 24" |
| Parshall Flume @ Effluent | 1 | EA | 3,037.37 | \$3,037 | 12" |
| Electrical | 1 | LS | 210,857.68 | \$210,858 | use 8% of above |
| Building Extension | | | | | |
| Addition to Existing Building | 900 | SF | 150.00 | \$135,000 | added size for additional pumps |
| Existing Plant Demolition | | | | | |
| Earthwork | 1 | LS | 7,314.27 | \$7,314 | |
| Concrete Slab & Footings | 100 | CY | 255.36 | \$25,536 | assume 18" avg thickness to account for ftgs, etc |
| Relocate Existing Filtration Bldg, etc | 1 | LS | 34,071.36 | \$34,071 | 60' x 30' x 10' eave ht metal bldg-remove contents, dismantle & re-erect |
| Repairs, Touchup, etc | 1 | LS | 5,000.00 | \$5,000 | allowance for some painting, sealants, doors, etc |
| Water | 1 | LS | 4,234.70 | \$4,235 | sink, emer. Shower, hose bibbs, piping & service |
| Sanitary | 1 | LS | 1,917.35 | \$1,917 | toilet, piping & service |
| Drains | 1 | LS | 2,117.35 | \$2,117 | |
| HVAC | 1 | LS | 1,617.35 | \$1,617 | reinstall unit heaters |
| Electrical | 1 | LS | 4,933.48 | \$4,933 | reinstall, fixtures, panels, wiring, etc |
| <u>Tertiary Media Filters</u> | | | | | |
| HDS Pump Station Complete | 1 | LS | 70,000.00 | \$70,000 | cost by DAH |
| Water Reuse Pump Station Complete | 1 | LS | 30,000.00 | \$30,000 | cost by DAH |
| Distribution Piping | 500 | LF | 35.00 | \$17,500 | 4" plastic, below grade |
| Media Filter System | 1 | LS | 566,834.08 | \$566,834 | quote=430000 + 10% frt + 10% mu & 100hrs to install |
| Liquid Polymer System | 0 | LS | 47,634.41 | \$0 | Not required per JS 11/28/2000 |
| Backwash Pumping Complete | 1 | LS | 133,461.22 | \$133,461 | Bob York spreadsheet + 10% OH&P, scaled to 2500gpm + escalation to 2000gpm |
| Dirty Backwash Storage Tank, 30,000gal | 1 | EA | 22,500.00 | \$22,500 | \$.75/gal |
| Dirty Backwash Storage Tank Mixer | 1 | EA | 3,737.46 | \$3,737 | allowance |
| Dirty Backwash Return Pump | 1 | EA | 13,885.36 | \$13,885 | allowance |
| Clean Backwash Supply Tank, 30,000gal | 1 | EA | 22,500.00 | \$22,500 | \$.75/gal |
| Clean Backwash Supply Pump | 1 | EA | 13,885.36 | \$13,885 | |

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| Building Complete | 1 | LS | 318,750.00 | \$318,750 | 85'x 50 @ \$75/sf |
| Electrical/I&C | 1 | LS | 0.00 | \$0 | included |
| Mechanical | 1 | LS | 0.00 | \$0 | included |
| Backflow Preventer | 1 | EA | 10,000.00 | \$10,000 | allowance |
| Distribution Piping | 1,000 | LF | 23.00 | \$23,000 | 2" plastic |
| Paint | 1 | LS | 5,000.00 | \$5,000 | misc painting allowance |
| SUBTOTAL | | | | \$4,319,374 | |
| MISC ALLOWANCE | 5% | | | \$215,969 | |
| SUBTOTAL | | | | \$4,535,343 | |
| CONTINGENCY | 20% | | | \$907,069 | |
| SUBTOTAL | | | | \$5,442,411 | |
| MOBILIZATION | 15% | | | \$816,362 | |
| CONSTRUCTION TOTAL | | | | \$6,258,773 | |
| SALES TAX ON MATERIALS | 5.0% | | | \$186,656 | |
| ENGINEERING AND SUPPORT | 20% | | | \$1,251,755 | |
| CONSTRUCTION MANAGEMENT | 8% | | | \$500,702 | |
| CAPITAL TOTAL (ROUNDED) | | | | \$8,198,000 | |
| ANNUAL O&M COST | | | \$763,000 | | |
| NPV OF ANNUAL O&M COSTS (30 YEARS @ 7% INTEREST) | | | | \$9,468,000 | |
| TOTAL 30-YEAR PRESENT WORTH COST @ 7% INTEREST | | | | \$17,666,000 | |

NOTES:

Misc Allowance markup is to include items known to exist but cannot be quantified at this time.
Contingency is for scope changes that are presently unforeseen.
Mobilization includes bonds, insurance, temporary facilities, health & safety, demobilization, etc.

NOTE: The above cost opinion is in October 2000 dollars and does not include escalation.
The order of magnitude cost opinion shown has been prepared for guidance in project evaluation at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final schedule and other variable factors. As a result, the final project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.